A BIBLIOGRAPHY FOR MAKERS OF SMALL ARMS: A Reference List Of Information Resources For Those Who Design, Make And Test Guns And Ammunition

Authored By Joseph Reichert

First Publication: October 15, 2025
Revisions: January 19, 2026
May be downloaded at https://www.josreichert.com/free-resources/

Introduction

It has been 31 years since I first produced a bibliography covering the design, making and testing of guns and ammunition. My first effort was modest, though I convinced myself that it was encompassing and thorough. Of course, this amounted to little more than self deception; continuous inquiry since that time has revealed what a small portion of the available material I had uncovered.

I now realize that anything I compose can represent only a small drop drawn from the ocean of information on this topic. The limitations imposed upon even the most assiduous inquirer are numerous, and it seems that the task I have set for myself can never be complete. Therefore, I regard the bibliography I am striving to perfect as a work in progress. I can only approach this task by constant iteration, always uncovering additional worthwhile information and adding it to the sources already listed.

Sources That Qualify For Inclusion In This Bibliography

In order to make this bibliography useful, it must have a clear objective: the materials chosen for inclusion must pass a threshold test for utility. To be listed in this compendium, a book or other information resource must contain specific instruction which provides the diligent worker with significant knowledge needed to design, make, or test firearms or ammunition.

To achieve this standard, a book, video presentation, drawing, or recorded lecture must do more than blandly describe the general characteristics of a weapon system. By way of example, it is general knowledge that gun barrels are produced by deep hole drilling machines, and the rifling found in them is formed by a variety of methods, including application of cutting tools, forging machines, electrical discharge tools, and other devices. While this is useful knowledge, and should be understood as a starting point for anyone who intends to pursue the building of small arms, to be worthy of inclusion in this bibliography a publication must communicate specific instruction which provides the serious worker with the knowledge required to manufacture rifled barrels.

While this document is captioned as a “bibliography,” it contains references to sources of information other than books. Because it is my goal to create the most encompassing possible resource, it includes all reliable information captured in permanently recorded form.

Judging The Reliability Of Sources

And what, exactly, do I intend by the term “reliable”? It must be distinctly understood that I have not evaluated every statement by the process of experimental verification. In many cases, I have been obliged to rely upon circumstantial evidence that the instructions I document are effective, and will yield the promised results. As a general matter, I have adopted the following standards to evaluate the utility of the sources I cite:

1. In some cases, I have been able to refer to my own direct experience as a machinist and prototype instrument maker. By way of example, I have had experience in general machining practices, coloring and plating of metals, the principles of deep hole drilling, precision measurement, preparation of manufacturing drawings and tolerancing, and a variety of other aspects of shop practice. This provides me with a background which permits me to identify obvious poppycock, but it does not make my judgment infallible.

2. Barring direct personal experience in certain processes, resort must often be had to the reputation of the author of a given work, and the acceptance which his writing has found in the community of gunmakers. One sound example of this is *Hatcher’s Notebook* (Julian S. Hatcher, The Stackpole Co., Harrisburg, Pa., 1962). While no responsible student of weaponry would claim that every conclusion stated in Hatcher’s book is beyond question, anyone well versed in the technology of firearms must acknowledge that it has been generally accepted as reliable by designers, ordnance engineers, military armorers, and professional users of weaponry.

3. There is a distinctive class of documents which might be characterized as self-authenticating, and these are formal reports relating the results of experimental trials. It is

undeniable that some reports are of little practical use, inasmuch as they must communicate *procedures which fail to yield a desired result*. On the other hand, the remainder often reveal an improved process or design, or disclose controllable factors which make it possible to tailor a technology to the results we seek. As another concrete example, I would refer to *A Comprehensive Review Of Black Powder*, (Ronald A. Sasse, U.S. Army Ballistic Research Laboratory, U.S. Army Ballistic Research Laboratory, Aberdeen Proving Ground, Md., 1985). This short treatise is a potpourri of experimental results, manufacturing practices, quality control methods, and educated judgments relating to black powder.

4. The most difficult documents to obtain are also the most interesting, namely, the internal memoranda, developmental drawings, reports, and shop notes made by employees of firearms and ammunition manufacturers. These sources can range from a notebook kept by a tool and die maker at an ammunition plant, to the design drawings prepared by engineers in the home office of a major gun manufacturer. Such documents are hard to come by. Perhaps the most interesting resources I have ever seen on the subject of gun manufacturing were engineering drawings, notes kept by manufacturing staff, and correspondence related to the production of a small caliber handgun. This weapon was widely marketed in the U.S., but I am unable to make use of these papers for various legal reasons. The biggest obstacle is the fact that they were revealed by the gun manufacturer in response to a request for production issued in the course of a lawsuit, and are protected from general publication by a “protective order” entered by the court where the case was tried.

5. From time to time, qualified designers are moved to tell us what they do and how they do it. Prominent among such works is the book *The Thompson M1A1 Submachine Gun* (David S. Findlay, Self Published, Las Vegas, Nevada, 2022). This book contains a detailed description of the design process for the weapon, complete documentation of the calculations which support the design, and detailed manufacturing drawings of its parts. As stated on the back cover, “This book is unique in that it exposes the engineering that goes behind a gun design project.”

This is a general description of the principal categories of sources which yield information I deem reliable, and from which I have drawn in composing this bibliography. However, I hesitate to claim that all worthy sources must come from of one of these five categories. Indeed, every candidate for inclusion must be evaluated individually, and accepted or rejected after a thorough review and the application of prudent judgment.

Formatting Of The Reports Included In This Bibliography

In reporting on the books and other resources I have included in this bibliography, my objective is to inform the reader of the valuable information to be found in my sources, reporting on the practical skills which each communicates. My summaries also contain my assessment of each source, in which I distinguish its best aspects from its weaknesses; this requires the exercise of my own judgment, but I strive for fairness and impartiality in this respect. Finally, where possible I direct the reader to a publishing house or other seller who can provide a copy of the resource, and I state the price of a copy. Obviously, sellers and sales priced will change over time, and I can only provide the information that is current on the date I write.

To encapsulate this information, I have established a fixed format for these reports, as follows:

Title: _____
Format: _____
ISBN: _____
Author: _____
Publisher: _____
Place Of Publication: _____
Year Of Publication: _____
Vendor, Price: _____
Material Description: _____

All entries will appear in bold type.

Subjects Covered, Key Words And Phrases

General Summary Of Work

Practical Skills Communicated By This Source

Strong Points

Weak Points

Overall Assessment

Order Of Presentation

The sources covered are presented by title, listed in alphabetical order. To make this project more useful to my readers, it is my intention to distribute it as a searchable PDF. For those who are seeking specific information, this feature should make their investigations easier.

Continuous Supplementation Of This Bibliography

My search for informative resources is an ongoing process, which means that this bibliography will grow as I uncover new and valuable information. I do not intend to set a fixed schedule for publishing these updates, but shall supplement this document with additional citations when I judge that a sufficient number of new materials have accumulated to make an update worthwhile.

Title: **Black Powder Manufacturing, Testing And Optimizing**
Format: **Book**
ISBN: **0929931211**
Author: **Von Maltitz, Ian**
Publisher: **American Fireworks News**
Place Of Publication: **Dingmans Ferry, Pennsylvania**
Year Of Publication: **2003**
Vendor, Price: **Skylighter, www.skylighter.com, $55.14**
Material Description: 1 **volume, soft cover, 8.5" x 11", 208 pages, black and white photographs, drawings and charts.**

Subjects Covered, Key Words And Phrases

Black powder, chemistry of
Black powder, commercial manufacture described
Black powder, commercial specifications for fireworks
Black powder, manufacturing
Black powder, methods of incorporation
Black powder, reducing cost of
Black powder, safety in manufacturing
Black powder, testing methods and evaluation of
Charcoal, manufacturing methods
Charcoal, quality critical to black powder

General Summary Of Work

This book is the most complete general treatise available on the small scale manufacture of black powder. It is written from the viewpoint of a pyrotechnist, and does not address the making of black powder for use in firearms. This does not appear to present a problem, because the pyrotechnic industry is concerned with the use of black powder as a propellant, and this book contains extensive information on how the speed and power of black powder may be enhanced by the use of proper manufacturing techniques. The instruction it provides is easily adapted to the manufacture of black powder for firearms.

This work is the improved and updated successor to the author's previous book, *Black Powder Manufacture Methods And Techniques* (American Fireworks News, Dingmans Ferry, Pennsylvania, 1997). All worthwhile information from the older book is repeated in the newer version, and therefore this bibliography contains no separate report on the first work.

Practical Skills Communicated By This Source

This book covers the making of black powder in small batches. It provides instruction on the quality of the ingredients needed for high quality black powder, and covers multiple methods of incorporating those ingredients to a degree that optimizes the strength of the powder. It details the equipment needed to produce black powder in an efficient and consistent way, and instructs the reader on the proper methods of processing the powder through pressing and granulation.

Strong Points

This book provides specific instruction on making black powder on a small scale. It is significantly different from other attempts on this subject because it covers all stages of the manufacturing process in detail. Perhaps most importantly, it emphasizes and explains the need for best quality charcoal if the highest grade of powder is desired. Among other entries on the subject of charcoal, it contains a chapter covering the suitability of different varieties of wood as sources of black powder charcoal.

It is also gratifying to see that the author opens his book with a chapter on safety, and correctly reminds his readers that the manufacture of black powder is *always dangerous*. He wisely emphasizes that black powder manufacturing techniques must not be characterized as "safe and safer," but as "more dangerous and less dangerous."

Weak Points

This book is weak where one would expect weakness. Because it is written by a pyrotechnist for fireworks makers, it does not go into great detail on making black powder for the shooting community. It would be helpful had he explained the process of grain sizing, powder tumbling and graphite glazing in more detail. To his credit, he does summarize these processes briefly. It must be remembered that his intended readership is unlikely to care much about the subjects of granulating and finishing black powder, because these refinements are not required in the fireworks industry.

Overall Assessment

This book is indispensable for anyone who intends to make black powder, and demands a quality product. I have sought out information n black powder making for many decades, and this is the only book which explains the manufacturing process in detail, and provides information which permits the aspiring powder monkey to establish a regular process for producing a consistent quality product.

Title: **Building A Percussion Lock: A Muzzle Loading Firearm Project For The Home Shop**
Format: **Book**
ISBN: **9781984277343**
Author: **Davis, Glen**
Publisher: **Self Published**
Place Of Publication: **Coppell, Texas**
Year Of Publication: **2018**
Vendor, Price: **Amazon, www.amazon.com, $24.95**
Material Description: **1 volume, softcover, 8" x 10", 83 pages, color photographs, black and white drawings.**

Subjects Covered, Key Words And Phrases

Firearm fabrication, by sawing and filing
Firearms construction, completed with basic hand tools
Firearms, manufacture in the home workshop
Gun locks, percussion, coil spring actuated
Gun locks, percussion, design of
Gun locks, percussion, fabrication of
Metal fabrication, manual techniques

General Summary Of Work

This is the simplest book on firearms construction that I have discovered, with the exception of the author's other gun building manuals. It provides instruction in the design and fabrication of a simple percussion lock composed of seventeen component parts. In this design, the hammer is driven by a coil spring rather than the more traditional leaf spring often found in such locks. The builder need not trouble himself with the art of spring making; an appropriate coil spring can almost certainly be found at any well-equipped hardware store.

Only the simplest of home workshop tools are required to make the lock described, the most sophisticated being a drill press. However, the author even shows how one can complete the project without a drill press, albeit with somewhat more effort and skill.

Perhaps the most interesting aspect of this work is that it demonstrates how a lock can be made without the use of measuring tools. I would describe his process as "building a lock by fitting the parts to each other as they are filed out."

Practical Skills Communicated By This Source

I will admit that my first brief perusal of this book left me a little offended, but a thorough second reading made me realize its value. Without a doubt, the methods described by the author must be very like those used by early frontier gun makers, who lacked precision measuring tools and manufacturing prints. Having "fiddled out" a working lock in a primitive workshop, the rustic craftsman could very easily turn out additional examples by referring

back to his prototype. That is, he would apply the method of referring back to a “pattern,” following the practice established by Great Britain when it established its famous pattern room.

This book will show the reader how to make a functional lock with simple hand tools, manual skill, and a good sense of proportion.

Strong Points

This book is valuable because it emphasizes the importance of manual skill and developed judgment in the making of guns. It invites the aspiring gun maker to take on a useful project without first accumulating a workshop filled with expensive machines and long formal training. The lock project itself is so inexpensive that failure will be painless; if the first attempt fails, throw the work away and start over with a new batch of scrap steel and a few simple tools.

Weak Points

This book could use some additional proofreading, because in several places it suffers from obvious misspellings and sentences that are not quite completed. However, the author’s meaning is always clear. I would also like to see better schematics of the lock, but this defect does not detract from the author’s message, as a careful reading of the text will make it clear just how the mechanism goes together.

The book does not address the issue of the durability of the author’s design, because it does not have much to say concerning metallurgy, which has a bearing on wear and fatigue. Constant use of any lock will induce changes through friction and stress, which are always considerations in any gun mechanism.

Overall Assessment

This is a valuable book, because it shows the reader how to build a workable lock with simple tools and enthusiastic effort. I find that it goes a long way towards restoring the simple joy of making things.

Title: **Building A Single-shot, Falling-block Rifle Action**
Format: **Book**
ISBN: **13:9780941653541**
Author: **Mueller, Walter B.**
Publisher: **Village Press, Inc.**
Place Of Publication: **Traverse City, Michigan**
Year Of Publication: **2016**
Vendor, Price: **Village Press, Inc., www.villagepress.com, $18.00**
Material Description: **1 volume, softcover, 8.5" x 11", 41 pages, black and white charts, drawings and photographs**.

Subjects Covered, Key Words And Phrases

Actions, falling block, design of
Actions, single shot, materials selection in design of
Machine tools, technology applied to fabrication of falling block actions
Materials, mechanics of, applied to design of rifle actions
Receivers, design calculations
Receivers, sidewall strength
Rifles, design of
Rifles, construction, sequence of operations in
Rifles, single shot, design of actions
Tapers, locking, coefficient of friction in

General Summary Of Work

This book is comprised of a series of articles authored by Walter B. Mueller in 1998. It is a complete description, and set of instructions, on the building of a single-shot, falling-block action rifle, chambered for the .225 Winchester cartridge. The author describes the construction of his weapon from the stages of design, material selection and engineering calculations through the machining of the finished rifle.

The clarity and detail in this book make it unique for instructional purposes. If compared to any other book on the subject firearms manufacture, it will be found to closely resemble the detailed approach of Colvin and Viall's *Manufacture Of The Model 1903 Springfield Service Rifle* (Wolfe Publishing Co., Inc., Prescott, Arizona, 1984).

Practical Skills Communicated By This Source

Though it tracks the style and methodical approach of *Manufacture Of The Model 1903 Springfield Service Rifle,* Mueller's work is shorter, covering a rifle with fewer parts than the Springfield, and amenable to manufacture in a small machine shop. For those who are serious about building a strong and highly accurate rifle, this book covers all of the tasks they must accomplish to put out a finished gun.

Strong Points

This book leaves no doubt concerning how the author constructed his gun, and describes the process with such granularity that his methods can be exactly replicated by his readers. His explanation of the principle of locking tapers, which keeps the breech block of this rifle in place during firing, is executed with virtuous clarity.

Weak Points

I find no weak points in this book, because it succeeds in its instructional objectives. The only caution I would state for the reader is that, like many other works included in this bibliography, it does not teach one how to be a machinist. However, the craft of machining is learned by doing, and all who have worked at the trade know that it is often necessary to modify an operation several times before success is achieved. Patience is advised.

Overall Assessment

This book is a “must have” for all those who are determined to become gunmakers. If the reader does not aspire to make the same rifle fabricated by Mueller, the study of this book will impart a wealth of knowledge which will carry over to many other gun projects.

Title: **Building Triggers: A Muzzle Loading Firearm Project For The Home Shop**
Format: **Book**
ISBN: **9781985883864**
Author: **Davis, Glen**
Publisher: **Self Published**
Place Of Publication: **Coppell, Texas**
Year Of Publication: **2018**
Vendor, Price: **Amazon, www.amazon.com, $24.95**
Material Description: **1 volume, softcover, 67 pages, 8" x 10", color photographs, black and white drawings**

Subjects Covered, Key Words And Phrases

Hardening, case hardening
Metallurgy
Set trigger, double pull
Set trigger, single pull
Trigger, design and fabrication
Trigger, single trigger with trigger plate
Triggers, construction of
Triggers, function of

General Summary Of Work

This is another simple and straightforward book on firearms construction by Glen Davis. He also authored *Building A Percussion Lock: A Muzzle Loading Firearm Project For The Home Shop* (Coppell, Texas, 2023) and *Designing And Building Rolling Block Firearms In The Home Work Shop* (Monee, Illinois, 2023), which are included in this bibliography.

This work provides instruction on the design and fabrication of triggers, which may be used with the locks Mr. Davis makes. It suggests that the craftsman will need a workshop equipped with the same basic hand tools recommended for the making of locks, namely, a drill press, hacksaws, files, center punches and metal scribes. As some parts should be case hardened, a MAPP torch and case hardening powder are also recommended.

The triggers are made out of mild steel, spring steel, and manufactured pins. The author identifies other salvaged materials which can be substituted for commercially available spring steel and pins, but notes that they may wear more quickly than the commercial articles.

The book provides instruction on making three assemblies: a single trigger, a single pull set trigger, and a double pull set trigger.

Practical Skills Communicated By This Source

This book expands upon the skills taught in the author's book on lock making. It shows the reader how to make functional triggers with simple hand tools, manual skill, and a good sense of proportion.

Strong Points

It not only shows the artisan how to make triggers, but in doing so provides him with a simple and effective lesson in how triggers work. As one who has struggled though many patent drawings and technical manuals, this is something I find exceptionally useful. If the literature of firearms is conspicuously weak in any respect, it must be found in the poor explanations of mechanical assemblies such as locks, trigger mechanisms and ammunition feed devices. With this book in hand, you will be able to say that you thoroughly understand three basic trigger designs, and can visualize the mechanical linkages which make them function.

Weak Points

As with his work on lock making, this book would be better if it addressed the issue of the durability of the author's designs. Therefore, it could provide more information on metallurgy, which has bears on that issue. One way of improving this aspect of the book might be to include a section on the hardening and tempering practices followed by traditional gunsmiths.

Overall Assessment

This book is successful in teaching its subject matter. The adventurous worker who plunges into trigger making and follows the author's spontaneous methods will learn a lot, and will learn it quickly. The tool requirements are so minimal, and the cost of the materials so inconsequential, that one may discard a failed attempt and start all over without regret.

Title: **Bullet's Flight From Powder To Target, The**
Format: **Book**
ISBN: **None Found**
Author: **Mann, F.W.**
Publisher: **Palladium Press**
Place Of Publication: **Birmingham, Alabama**
Year Of Publication: **1997 (Reprint)**
Vendor, Price: **Abe Books, https://www.abebooks.com, $34.98**
Material Description: **1 volume, hardcover, 6.5" x 9.5", 384 pages, black and white photos, drawings and charts.**

Subjects Covered, Key Words And Phrases

Ballistics
Ballistics, experimental
Ballistics, external
Ballistics, internal
Ballistics, terminal
Ballistics, testing apparatus
Ballistics, testing methods
Bullet behavior, design of experiments to determine
Bullets, accuracy of
Bullets, characteristics
Bullets, experiments to determine behavior of
Bullets, form as affecting accuracy
Bullets, effect of muzzle blast upon flight
Firearms, causes of inaccuracy

General Summary Of Work

The author, Dr. Franklin W. Mann, was a medical doctor who left the practice of medicine to become a machinery manufacturer, and after becoming wealthy through his manufacturing enterprise devoted himself entirely to the study of firearm accuracy. Distilled to its essence, the question Dr. Mann pursued with single-minded tenacity was this: Why do firearms produce erratic and inaccurate results, even when they are fired from rigidly constructed shooting platforms, without any human intervention in the processes of aiming and pulling of the trigger?

To find the answer to this question, he designed and executed an enormous number of carefully planned trials, testing every conjecture concerning possible sources of inaccuracy. This book records the hypotheses he posed, the experimental mechanisms he constructed to test his hypotheses, the results of his experiments, and the conclusions he drew from those results.

The experiments related in this book are so numerous and so broad in scope that my attempt to summarize his investigations in the foregoing list of *Key Words And Phrases* is rather

weak; the statement of matters covered by the author can be broken down into sub-categories so numerous that the list would be burdensome.

Practical Skills Communicated By This Source

This book was first published in 1909, before the advent of the many innovations which make it far easier to measure barrel pressure, bullet velocity, and to observe a bullet in flight. Dr. Mann was called upon to investigate complex questions by the skillful use of the simpler mechanisms available in his day. He was successful at this because he was adept at breaking complicated events down into sets of concurrent, less complex phenomena.

To cite one impressive example among many, he devised a novel method to determine rifling twist. After measuring the twist in a .30-40 government Springfield barrel with a tight-fitting swab turning a cleaning rod, which he calls a measurement made “according to old-time custom,” he decided that he could obtain a better measurement by determining the rate of rotation as it exited the bore. He recognized that the rate of twist in the barrel would be duplicated in the rate of rotation of a bullet in flight.

Accordingly, Dr. Mann prepared a set of bullets without sharp points, but made with “chisel point” tips, which caused such a projectile to index its rotational posture as it passed through a piece of target paper. Acting on his impression that the barrel was rifled with one full turn in nine inches, he placed one target six feet from the muzzle, and a second target exactly nine inches behind it. It follows that if the barrel has a twist of one turn in nine inches, the index mark on the first target should be identical to the indexing mark on the second target.

Firing his specially prepared bullets through his carefully spaced targets, he found that the indexing marks on the first screen did not match those on the second, the imprints showing that after nine inches of travel the bullets had not yet completed a full rotation. He then increased the distance between the targets, finding that the index marks matched very closely when they were spaced ten inches apart. After carefully varying the distances between his targets, he determined that the test barrel was rifled with one turn in 10.034 inches. (Test 177, summarized on pages 338 through 340) As he concluded, “We were deceived by the swab test.”

I cite this test as a single example, drawn from many well designed experiments. Dr. Mann’s success as an experimenter proceeds from his ability to break problems down into simpler components and recognize alternative methods of gathering data. If you would like to acquire this useful practical skill, read his book.

Strong Points

The strong points of this book reside in its ability to effectively communicate how to do much with little, how to break seemingly intractable problems in ballistics into simpler, solvable problems; and how to pose multiple question until the consequential, meaningful question is found. Its strength is in the approach it teaches.

Weak Points

To call any part of this work weak would be unfair, because Dr, Mann could only work within the context of the technology accessible to him. However, many who read his book will immediately feel the impulse to update his experimental contrivances with modern technology, taking advantage of improved pressure testing, easier velocity measurement, spread sheet analysis, computer modeling, and all the other conveniences which have arisen since his time. I am quite certain that, were he able to visit our present age, he would not hesitate to make full use of all modern experimental tools.

Overall Assessment

This book must be considered indispensable reading for anyone who aspires to design and fabricate guns and ammunition. It framed many of the foundational questions in the field of firearms ballistics, and provides an elegant example of how to become an experimental ballistician.

Title: **Caseless Ammunition For Small Arms**
Format: **Book**
ISBN: **1880484072**
Author: **Dmitrieff, George B.**
Publisher: **Zebrowski Historical Services Publishing Company**
Place Of Publication: **Bloomingburg, New York**
Year Of Publication: **1993**
Vendor, Price: **Abe Books, www.abebooks.com, $69.50**
Material Description: **1 volume, softcover, 7" x 10", 108 pages, black and white photos, drawings and charts**

Subjects Covered, Key Words And Phrases

Ammunition, caseless
Ammunition, caseless, development of
Ammunition, caseless, electric ignition systems
Ammunition, caseless, experimental tools
Ammunition, caseless , firearms designed for
Ammunition, caseless, high power rifle cartridges
Ammunition, caseless liquid propellants for
Ammunition, caseless, methods useful for developers of
Ammunition, caseless propellant formulas for
Ammunition, caseless , rimfire cartridges
Ammunition, caseless, shotgun shells
Ammunition, caseless, solid propellants

General Summary Of Work

I believe this book is best described as a survey of the state of development of caseless ammunition, current as of the date it was published. By this statement, I do not mean that this book is outdated, because it outlines the technical challenges faced by the developers of caseless ammunition, and most of those challenges have not been fully overcome as of 2025.

Among the challenges presented to the developer are the problem of achieving adequate obturation with caseless ammunition, the need to develop satisfactory combustible primers, and the difficulties presented by fouling buildup in a bare chamber, when no cartridge is present to contain and evacuate propellant residues.

The book also describes, in succinct terms, many of the formulas for solid and liquid propellants tried in experimental caseless systems, and illustrates the construction of a variety of caseless cartridges.

Practical Skills Communicated By This Source

The author presents a number of experimental setups which will be of interest to those developing caseless ammunition, and summarizes, with useful schematics, some of the

systems proposed for use with caseless rounds. These include explanations of electric ignition systems, obturation mechanisms, and tools for molding pellets of solid propellant.

This book will be of greatest value to the reader who wishes to design and experiment with caseless ammunition. It contains references to books, reports and research papers on the subject of caseless ammunition, and these references will lead the reader to a broad range of other information resources.

Strong Points

This work sets out in plain terms a list of problems which must be overcome to make caseless ammunition practical, and contains an abundance of suggestions for experiments one may try to arrive at practical solutions.

Weak Points

This book is rather spare, and its complex topics are not covered in depth. This is not a defect if one accepts it as an organized starting point in the quest for technical solutions to the problems of caseless ammunition. The author's approach makes it quite clear that the purpose of the book is to give experimenters a base from which they can work. However, do not buy this book in the anticipation that it will teach you to make flawless caseless ammunition; caseless ammunition is still in search of a Samuel Colt or John Browning to bring it to fruition.

Overall Assessment

The perfection of caseless ammunition that is both commercially viable and militarily useful will mark the greatest advance in arms technology since the invention of functional metallic cartridges. If you want to be the genius who creates this perfected technology, you must begin somewhere, and I suggest that this book is a good starting point on the road to fame.

Title: **Chemistry Of Powder And Explosives, The**
Format: **Book**
ISBN: **15591804209 (Volume I), 1559180439 (Volume II)**
Author: **Davis, Tenney L.**
Publisher: **Lindsay Publications, Inc. (Reprint)**
Place Of Publication: **Bradley, Illinois**
Year Of Publication: **1990**
Vendor, Price: **Amazon, www.amazon.com, $19.95**
Material Description: **2 volumes, softcover, 5.5" x 7.5", 489 pages, black and white photographs and charts**

Subjects Covered, Key Words And Phrases

Ammunition, small arms, complete round described
Black powder
Black powder, substitutes for
Detonators
Dynamite, and similar explosive materials
Explosives, primary
Explosives, properties
Fulminating powder, composition and effects
High explosives, derivatives of aromatic nitro compounds,
High explosives, derivatives of nitric esters
Nitroamines , use as explosive materials
Primers, for small arms cartridges
Pyrotechnic compositions
Smokeless powder, behavior of
Smokeless powders, composition of
Smokeless powders, manufacturing process

General Summary Of Work

This work, originally published in two volumes, was authored by Dr. Tenney L. Davis, then a professor of organic chemistry at the Massachusetts Institute of Technology. The original version was published by John Wiley & Sons, the first volume appearing in 1940 and the second in 1942. It was reprinted by Lindsay Publications, Inc., in 1990, when it again appeared as two separate volumes. Since that time, it appears to have been reprinted by a number of other publishing houses, and many of the most recent versions combine both volumes into one book.

This work might be best described as a summary of all pyrotechnic mixtures and explosive compositions in general use at the time of its first publication. It was clearly published in response to the pressures of war, and the author makes it clear that it should be considered as an aggregation of the technology which was generally known by all then working in the explosives industry.

These books approach their subject from the standpoint of manufacturing chemistry, describing pyrotechnic and explosive materials in terms of the practical procedures employed in their manufacture. It is not concerned with the more esoteric aspects of explosives chemistry, and the reader will not find thermodynamic analysis of explosive materials, nor in-depth explanations of chemical bonds.

Practical Skills Communicated By This Source

This work instructs the reader in the methods employed to produce the explosive materials it covers. It informs the student of the methods and formulas that work, if one wishes to replicate the explosives and propellants in general use in the fourth decade of the twentieth century.

Strong Points

This book is clear in its explanations and authoritatively explains how products such as smokeless powders, primers, and commercial high explosives are prepared.

Weak Points

It must be distinctly understood that these books lack information on safety when handling powder and explosives. In this respect, it is a product of its times. The recent reprints of this work contain introductions cautioning the reader that it is not a “how to” manual, and exhorting the student to reject the impulse to make the products it describes. This is good advice, but it does not appear to have been the position of its author, Dr. Davis. One cannot help but note that that he appears to assume that his recipes will be followed by experimenters, though he occasionally comments on the exceptional dangers posed by particular primary explosives.

If you seriously intend to avoid bodily injury or death, you should not undertake to make the recipes which the author describes.

It is also important to keep in mind that there have been many innovations and improvements in explosives technology since this book was written. While it would be unfair to call this a defect in the work, this book is not current, and omits technology developed after 1942.

Overall Assessment

This work is not current, but contains much information that is still valid. It is fair to say that it contains much concerning primers and propellants that the aspiring gunmaker must know, and Dr. Davis’ books are a sound avenue to much of that knowledge.

Title: **Comparison Of Spherical And Ellipsoidal Form Functions For Evaluating Black Powder**
Format: **Research Report**
ISBN: **None Found**
Author: **Sasse, Ronald A.**
Publisher: **Ballistic Research Laboratory**
Place Of Publication: **Aberdeen Proving Ground, Maryland**
Date Of Publication: **1988**
Vendor, Price: **Defense Technical Information Center, https://apps.dtic.mil/sti/html/tr/ADA201105/index.html, free download**
Material Description: **Report, 30 pages, 8.5” x 11”, black and white charts and lists.**

Subjects Covered, Key Words And Phrases

Black powder, best predictive models for characterization of
Black powder, characterization of the grain structure found in
Black powder, computerized experimental models of combustion
Black powder, experimental evaluation of
Black powder, models for evaluating burning characteristics of

General Summary Of Work

This is a research report prepared under the direction of the U.S. Army Ballistic Research Laboratory, reporting the results of experiments which determined the burning rate of black powder, and evaluating attempts to find the assumed particle shape which best explains the behavior of that ancient propellant. From statements in the report, one gleans that the experimenters had previously built a computer model which incorporated the assumption that black powder, as made for military use, consists of grains that are best characterized as spheres, but this model neither explained not accurately predicted its behavior when ignited. The model reported in this paper adopted the assumption that the grains of finished powder are more correctly characterized as elliptical solids, that is, like the shape generated when an ellipse is spun about its long axis. However, this model was also found deficient. The conclusion drawn in this report is that continued investigation suggests that grain fracture or grain break-up dominate closed-bomb evaluation techniques.

Practical Skills Communicated By This Source

The lesson to be drawn from this paper is that the behavior of black powder is best explained if we regard it as an aggregation of irregular particles, a mass composed of fractured shapes.

Strong Points

This report states the factual information drawn from a discrete experiment, and therefore is useful because it demonstrates that a model predicting the behavior of black powder cannot be based upon the assumption that its grains are best characterized as “ellipsoidal forms.”

Weak Points

As a statement of experimental results, this report cannot be said to have any “weak points,” though the results were, perhaps, disappointing to those who devised the ellipsoidal model.

Overall Assessment

This report is perhaps best understood as a window into what experimenters with black powder (and other propellants) would like to find, namely, a way to accurately predict its burning characteristics based upon the shape or shapes into which it is formed. This, in turn, leads us to formulate a series of questions concerning the best physical configuration of gun propellants.

If we seek predictability in rates of combustion and gas generation, will we obtain more consistent results from a finely granulated powder, or from a pellet shaped product, where each cartridge holds a single solid pellet, every pellet having the same shape, dimensional measurements, and density? Without further experiments, it would seem that the pellet is the answer to the problem of *predictable burning*. Do we make powder less predictable when we compound it out of numerous tiny particles which vary in shape.

It should be remembered that, just before the rise of smokeless powder as the propellant of choice, the army of Great Britain was using cartridges loaded with single solid pellets of black powder. Was this measure adopted to expedite the process of loading the cartridges, or was it also seen as a way of keeping velocity consistent from shot to shot?

Title: **Comprehensive Review Of Black Powder, A**
Format: **Research Report**
ISBN: **None Found**
Author: **Sasse, Ronald A.**
Publisher: **Ballistic Research Laboratory**
Place Of Publication: **Aberdeen Proving Ground, Maryland**
Year Of Publication: **1985**
Vendor, Price: **Defense Technical Information Center, https://apps.dtic.mil/sti/pdfs/ADA150455.pdf, free download**
Material Description: **Report, 8.5" x 11", 30 pages, black and white charts and lists.**

Subjects Covered, Key Words And Phrases

Black powder atmospheric strand burn rates of
Black powder, closed bomb evaluation of
Black powder, combustion temperature of
Black powder, compaction of meal
Black powder, flame spread rates of
Black powder, general characteristics of
Black powder, high pressure strand burn rates of
Black powder, quickness of
Black powder, structural strength of

General Summary Of Work

This paper documents the physical characteristics of black powder both as a structural material (How strong is a grain of black powder in compression?) and as an explosive and propellant (How much heat is given off by burning one gram of black powder? How much work can a given mass of black powder perform?). This information is important to those using black powder for any purpose, but it is seldom reported.

Practical Skills Communicated By This Source

I like to think of this report as a sort of resume of black powder considered as a job applicant, whether the job in question be propelling a bullet, or communicating fire to ignite a fireworks display. It answers the questions of what black powder can endure, how long it can last and how well it can remain functional, as well as providing insight into what velocities it can produce when loaded in a rifle cartridge. It will also give the powder manufacturer a good deal of information on how to produce powders for various purposes.

Strong Points

The strongest feature of this report is its emphasis on the importance of charcoal in the manufacture of quality black powder. It notes that its other ingredients (potassium nitrate and sulfur) are commercial chemicals amenable to exact testing for purity, but charcoal is a product which can be made from a wide variety of woods, which grow under a variety of conditions, and is produced by roasting wood in retorts at varying temperatures and for

various periods of time. Given the variable nature of charcoal, it seems black powder cannot be made absolutely consistent in its performance.

Weak Points

The only weak aspect of this report arises from the fact that it touches on numerous subjects, any one of which qualifies for a lengthy treatise of its own. That is, it would be better were its observation more fully elaborated. But in that case, it would no longer be a report but a ponderous book.

Overall Assessment

This is one of the best sources of information you will find concerning black powder, whether you wish to manufacture it, or use it for any of its traditional purposes. Moreover, it is free of charge.

Title: **Designing And Building Rolling Block Firearms In The Home Workshop**
Format: **Book**
ISBN: **9798462257322**
Author: **Davis, Glen**
Publisher: **Self Published**
Place Of Publication: **Monee, Illinois**
Year Of Publication: **2021**
Vendor, Price: **Amazon, www.amazon.com, $24.95**
Material Description: **1 volume, softcover, 8.5" x 11", 168 pages, black and white photos and drawings**

Subjects Covered, Key Words And Phrases

Bluing
Bluing, rust bluing
Case hardening
Firearms assembly
Firearms assembly, test fitting
Firearms design
Reamers, chambering
Reamers, expedient chambering reamers
Receivers
Receivers, laminated
Receivers, riveted
Rolling block, actions
Rolling block, pistols
Rolling block, rifles
Prototype firearms, testing

General Summary Of Work

This book instructs the reader in the design and fabrication of rolling block actions. The actions described are made by riveting side plates to a central block, to form a receiver. (The alternatives would be to cast a single piece receiver, or machine a receiver out of a solid block of material.) It proceeds to cover the fabrication of a rolling block pistol, including the making and fitting of a pistol grip made by bending steel strapping.

It also covers the making of a rifle, using the same type of receiver prescribed for the pistol. The focus of the book is the laminated receiver, which is suitable for light caliber weapons, be they hand fired or shoulder fired.

Practical Skills Communicated By This Source

This is the most ambitious of the author's books, and covers the designing and fitting of systems more complex than those addressed in his other works. Among other things, it deals with the alignment of a firearm barrel with the action to which it is attached. It is systematic in its treatment of the processes described, and clearly explains the tools and methods used by the author in his builds.

Strong Points

The receiver described in this book is the easiest to fabricate of any I have encountered, and seems a good starting point for one setting out on his gunmaking journey. The final product will be eminently suitable for a small caliber weapon, and the author states that it is adequate for use with the .22 long rifle cartridge. It is my judgment that other pistol calibers could be used in a weapon based upon Mr. Davis' "laminated receiver," and several candidates come to mind.

With care and attention to detail, the instructions in this book can become the foundation for a very nice small bore weapon. The final result will depend upon attention to detail on the part of the maker, and the quality of the materials used.

Weak Points

I found a few parts of this work a bit frustrating, not because it is in any part ambiguous, but because it simply leaves out crucial information that is hard to come by elsewhere. By way of example, the section on chambering the barrel (p. 124) relates that the author made his own "rough" chamber reamer, but provides no details on how this tool was made. In similar fashion, it does not offer any instruction on stocking the rifle he builds, though it goes without saying that he must have made some type of stock to complete the project.

Overall Assessment

This is a good and worthwhile book, but one must bear in mind that it is focused on the making of the author's laminated receiver, and the barreling of the action he has designed. With this understood, it is a great point from which to start building small falling block actions.

Title: **Firearm Anatomy, Book 1, The Thompson M1A1 Submachine Gun**
Format: **Book**
ISBN: **9781493673346**
Author: **Findlay, David S.**
Publisher: **Self published**
Place Of Publication: **Las Vegas, Nevada**
Year Of Publication: **2013**
Vendor, Price: **Barnes & Noble, https://www.barnesandnoble.com, $34.95**
Material Description: **1 volume, softcover, 8" x 10", 339 pages, black and white photographs, manufacturing drawings, and spread sheet printouts**

Subjects Covered, Key Words And Phrases:

Computer spreadsheet, use to determine cartridge impulse
Computer spreadsheet, use in gun design
Computer spreadsheet, use to determine cyclic rate of submachine gun
Cyclic rate of submachine gun, calculating
Design history, Thompson submachine gun
Design, submachine guns
Feed system, Thompson submachine gun
Gun design, mathematical calculations in
Magazine springs, design of
Technical analysis, submachine gun mechanisms
Thompson submachine gun, technical drawings of

General Summary Of Work

This book contains a thorough technical analysis of the Thompson M1A1 submachine gun, explaining it as a mechanical system, and demonstrating a methodical approach to the design of such a weapon. It is definitely an engineering book, and the attentive reader can learn from it how a designer goes from determining the characteristics needed in a submachine gun to designing a gun which meets well defined requirements.

Practical Skills Communicated By This Source

This book will provide the reader with an example of the application of the laws of physics to the challenges of gun design, while teaching specific technical competencies. It demonstrates how the designer can adapt computer spreadsheet technology to problems in gun design, in a way that gives the gun designer transferable design skills which may be applied to any gun design project. It also instructs the hands-on user in the intricacies of the particular submachine gun it covers, with a set of manufacturing drawings which completely cover all components of the Thompson M1A1.

Strong Points

This book is refreshingly instructive in teaching us exactly how a weapon is designed and made. As a source of gun design knowledge it has few peers.

Weak Points

I hesitate to say that this book has any “weak points,” but aspects of it will definitely displease those readers who expect to get through life without mathematics. To make effective use of it, the student should have a working knowledge of all the mathematical methods one would learn if he or she has mastered the highest levels of math usually offered in high school. It also requires a fairly high comfort level with applied computing, especially the Excel spreadsheet program.

Also, it must be kept in mind that this work contains little concerning several skills required to make a weapon. At a minimum, one would need competence in traditional machining, and to come up with an original design would be difficult if one is not trained in the use of a basic CAD program.

All of this is merely griping that this book does not teach us all we need to know to manufacture guns, but it does not claim to teach everything. The author opens the book with this sentence: “This book was written to generate people’s interest in gun design.” It fulfills that goal brilliantly, and it should be regarded as a cornerstone of any library assembled to teach the design, making and testing of guns and ammunition.

Overall Assessment

If you seek a thorough understanding of submachine gun design, this book should be regarded as a wellspring of basic knowledge..

Title: **Firearm Anatomy, Book II, The Sten Submachine Gun**
Format: **Book**
ISBN: **9781495975806**
Author: **Findlay, David S.**
Publisher: **Self published**
Place Of Publication: **Las Vegas, Nevada**
Year Of Publication: **2014**
Vendor, Price: **Barnes & Noble, https://www.barnesandnoble.com, $34.95**
Material Description: **1 volume, softcover, 8" x 10", 243 pages, black and white photographs, black and white manufacturing drawings, black and white spread sheet printouts**

Subjects Covered, Key Words And Phrases:

Barrels, design of
Computer spreadsheet, use of to determine cartridge impulse
Computer spreadsheet, use of to determine cyclic rate of submachine gun
Computer spreadsheet, use of in gun design
Gun design, mathematical calculations in
Magazine springs, design of
Magazines, feed system design
Sten submachine gun, design history of
Sten submachine gun, feed system of
Sten submachine gun, technical drawings of
Submachine gun mechanisms, technical analysis of
Submachine guns, calculating cyclic rate of
Submachine guns, design of

General Summary Of Work

This book contains a thorough technical analysis of the Sten submachine gun, explaining it as a mechanical system, and demonstrating a methodical approach to the design of such a weapon. It is definitely an engineering book, and the attentive reader can learn from it how a designer goes from determining the characteristics needed in a submachine gun to designing a gun which meets all stated requirements.

In addition to its technical aspects, it also contains an instructive history of the development of this iconic weapon, demonstrating how designers Reginald Shepherd and Harold Turpin brought together existing design knowledge concerning submachine guns with innovative and expedient manufacturing methods, to arm British troops in a time of grave national peril.

Practical Skills Communicated By This Source

Like Findlay's book on the Thompson submachine gun, this book will provide the reader with an example of the application of the laws of physics to the challenges of gun design, while

teaching specific technical competencies. It demonstrates how the designer can adapt computer spreadsheet technology to problems in gun design, in a way that gives the gun designer transferable skills which may be applied to any gun design project. It also instructs the hands-on user in the intricacies of the particular submachine gun it covers, with a set of manufacturing drawings which appear to completely cover all components of the Sten Mk I.

Strong Points

This book is refreshingly instructive in teaching us exactly how a weapon is designed and made. As a source of gun design knowledge it has few peers.

Weak Points

I hesitate to say that this book has any "weak points," but aspects of it will definitely displease those readers who expect to get through life without mathematics. It has this in common with its predecessor, *Firearm Anatomy, Book 1, The Thompson M1A1 Submachine Gun* (also covered in this bibliography). To make effective use of these books, the student should have a working knowledge of all the mathematical methods one would learn if he or she has mastered the highest levels of math usually offered in high school. They also require a fairly high comfort level with the use of computing, especially the Excel spreadsheet program.

Also, it must be kept in mind that this work contains little concerning several skills required to make a weapon. At a minimum, one would need competence in traditional machining, and to come up with an original design would be difficult if one is not trained in the use of a basic CAD program.

All of this is merely griping that this book does not teach us all we need to know to manufacture guns, but it does not claim to teach everything. The author opens the book with this sentence: "This book was written to generate people's interest in gun design." It fulfills that goal brilliantly, and it should be regarded as a cornerstone of any library assembled to teach the design, making and testing of guns and ammunition.

Overall Assessment

As with Findlay's first book which covered the Thompson submachine gun, this book should be regarded as a jewel of gun design knowledge.

Title: **Firearms Pressure Factors**
Format: **Book**
ISBN: **0935632859**
Author: **Lloyd E. Brownell, Ph.D., and other contributors**
Publisher: **Wolfe Publishing Company**
Place Of Publication: **Prescott, Arizona**
Year Of Publication: **1990**
Vendor, Price: **Amazon, https://www.amazon.com, $19.95 (Available only as CD-ROM)**
Material Description: **1 volume, softcover, 8.5" x 11", 162 pages, black and white photographs, drawings and charts**

Subjects Covered, Key Words And Phrases

Bullet acceleration, at instant of exit from muzzle
Bullet weight, effect upon firearms pressure
Caliber, effect upon firearms pressure
Firearms pressure, factors influencing
Freebore, effect upon firearms pressure
Gas leakage, effect upon firearms pressure
Jackets, effect upon firearms pressure
Powder and powder quickness, effect upon firearms pressure
Powder load, effect upon firearms pressure
Pressure excursions in firearm barrels
Rifle barrel, effect upon firearms pressure
Seating depth, effect upon firearms pressure
Secondary explosion effect ("SEE")
Systems analysis, as a means to understand firearms pressure
Pressure, measurement of

General Summary Of Work

This book is an examination of the factors that influence the pressures developed within the barrels of firearms. Among the subjects covered are the effects on pressure of the primer, case, shape and weight of bullet, seating depth, powder burning rate, chamber dimensions, and barrel condition.

This book is an attempt to develop a comprehensive overview of all the factors which influence barrel pressure when a gun is fired, and it explores small influences as well as the principal forces at work in a gun barrel.

Practical Skills Communicated By This Source

The most useful application of the information in this book will probably be found in the disciplines of cartridge development and reloading. Without the ability to apply the knowledge imparted by this work, reloading must necessarily be a “cookbook” proposition. This work can change these enterprises from empirical trial-and-error work to more of a predictive, deliberative design activity.

Strong Points

This book summarizes, in a methodical way, the influences upon firearms pressure. These influences are various, but largely controllable by knowledgeable cartridge designers and reloaders. The subject is treated in a fashion that can be understood, with patience, by those willing to engage in a limited amount of mathematical effort.

Weak Points

This book appears to be assembled from a series of individual articles published from 1967 through 1987, almost certainly drawn from periodicals sold by Wolfe Publishing. This may account for a certain “choppiness” in the presentation of the subjects it covers. I find that this work suffers from a lack of continuity, though it is still of immense value for any student of firearms pressure.

Overall Assessment

This book is the only one I have located which deals solely with the issue of firearms pressure, and for that reason alone is a “must read.” The content is quite clear and practical.

Title: **Hatcher's Notebook (Third Edition)**
Format: **Book**
ISBN: **9780811707954**
Author: **Hatcher, Julian S.**
Publisher: **The Stackpole Company**
Place Of Publication: **Harrisburg, Pennsylvania**
Year Of Publication: **1966**
Vendor, Price: **Ebay, www.ebay.com, $29.99**
Material Description: **1 volume, hardcover, 6" x 9", 640 pages, black and white photos, drawings, and charts.**

Subjects Covered, Key Words And Phrases

Ballistics, interior and exterior
Barrel, length of, effect on velocity
Barrels, strength of
Bullet performance, measurement of
Bullet, lubricant formulae
Bullet, penetration
Gun mechanisms
Headspace, explained
Overloads, in revolvers
Physical chemistry, of propellent powder
Primer, reliability, method of testing
Propellent powders, chemical considerations and mechanical effects
Receivers, heat treatment of
Recoil, theory of
Rifle barrel, obstructions, effects of
Steels, for receivers
Strength of rifles
Triggers, design and function of

General Summary Of Work

This book records the experiences and information assembled by Major General Julian Hatcher during his long career as an ordnance officer in the U.S. Army. He directed some of the most productive small arms development programs in our history. He was at various times the officer in charge of the Experimental Department of the Springfield Armory, Chief of the Machine Gun and Small Arms Section in the Engineering Division of Ordnance, the Works Manager of the Springfield Armory, the Officer in Charge of Small Arms Ammunition Manufacturing at the Frankford Arsenal, and filled a variety of other military postings in which he was responsible for the development of small arms and ammunition. He was also an enthusiastic participant in civilian shooting competitions, a promoter of firearms knowledge for all Americans, and an editor on the staff of *The American Rifleman*. He was at the center of

military small arms development from the First World War until well after the conclusion of World War Two.

This work represents the organization and explanation of firearms technology by the man who may fairly be called the foremost expert of his age on the subjects of ballistics and arms design. It contains the fundamental materials science and ballistic knowledge available to professional weapons designers through the middle of the Twentieth Century.

Practical Skills Communicated By This Source

This book supplies answers to an almost endless list of important pragmatic questions. If one wishes to know how far a rifle will shoot, what performance we may expect from a newly designed projectile, how thick a barrel must be to withstand the pressure of a given load, how strong a receiver should be and the class of steel of which it should be constructed. The answers to all of these questions are either provided directly, or can be determined from the information provided by Hatcher.

All of the author's conclusions are well founded in his solid knowledge of principles of physics and fundamental design considerations.

Strong Points

Ian McCollum, producer of the video series *Forgotten Weapons*, has characterized *Hatcher's Notebook* as an indispensable work. He is certainly correct in this assessment, and anyone determined to design, make, and test firearms and ammunition would be hard pressed to find any other source as clear and comprehensive as this work.

Weak Points

If I were to suggest any changes to this book, I would request that principles and experimental results which relate to the same subject matter be consolidated together, as certain connected topics are spread out and apt to appear almost anywhere in the text. By way of example, Hatcher places a chart of primer sensitivity test specifications on page 394 of his book, and not within his excellent section devoted to primers. Given the immense value of his book, my complaint is very close to petulant quibbling, but I believe the work would be easier to use if a certain amount of reorganization could be done.

Overall Assessment

As Ian McCollum has observed, this book is indispensable. Any worker in the field of small arms design and fabrication must have it, and should read it with care.

Title: **Home Workshop Prototype Firearms**
Format: **Book**
ISBN: **9798998586804**
Author: **Holmes, Bill**
Publisher: **Joseph Reichert, Inc.**
Place Of Publication: **Albuquerque, New Mexico**
Year Of Publication: **2025**
Vendor, Price: **Joseph Reichert, Inc., www.josreichert.com, $50.00**
Material Description: **1 volume, softcover, 8.5" x 11", 206 pages, black and white photos, charts and drawings**

Subjects Covered, Key Words And Phrases

Firearm actions, design of
Firearm barrels
Firearm fabrication
Firearm testing
Firearms fabrication, tools required for
Firearms, experience required to design and manufacturer
Firearms, fitting and assembly
Heat treatment, of firearm components
Magazines, fabrication of
Manufacturing, small scale production of firearms
Marketing, of firearm designs
Materials, availability of
Materials, standard shapes for use in firearm fabrication
Materials, standard shapes for use in manufacture of firearms
Metal finishing
Muzzle brake, design of
Muzzle brake, construction of
Recoil, design for control of
Sights, design of
Stocks, design of
Triggers, design and assembly

General Summary Of Work

This book is the work of machinist and professional gunmaker Bill Holmes (1929-2008). It is a summary of the methods he employed in his own business enterprise, stating his approach to the small scale manufacture of rifles, shotguns and revolvers. He personally managed the marketing and sale of the weapons he produced. With a foundation in the use of machine tools and shop work, and employing the methods outlined in this book, the motivated student of gun making can follow in his steps and produce functional firearms, including the building of magazines for autoloading weapons.

The version offered by Joseph Reichert, Inc., is an edited and updated reprint of the book originally sold by Paladin Press of Boulder, Colorado.

Practical Skills Communicated By This Source

This book explains in detail the principles and basic concepts behind a variety of gun designs, and contains many suggestions concerning ways that these designs can be simplified by the use of preformed materials, such as square metal stock, steel tubing, and, to some extent, plastics. It is not a book of exact “recipes” for the making of specific weapons, but a guide to designing and producing broad classes of guns. When presenting the fabrication of gun components, it provides examples and suggestions which will permit the reader to set up his own manufacturing system, and use materials generally available from local suppliers.

Strong Points

The best part of this book resides in the fact that it is rich in instructions that really work. The author explains in detail the processes entailed in designing, building and testing a gun, and a novice in the craft of gun making definitely needs this book to start his journey. After a careful reading of this text, the student will come away with a firm concept of many designs he can fabricate, and the skills, tools and materials he must possess to make the guns he has imagined.

Weak Points

The most common criticism of this book is the author’s resort to informal drawings, intended to present general concepts; he clearly is not interested in formal engineering prints, nor in conventional tolerancing callouts. I do not find that his drawing practices detract from the utility of the work, because his illustrations are very much identical to the concept drawings frequently shared by engineers when working up formal designs. However, in fairness to the critics, I must add that the book would be better had the author adhered to formal drawing rules.

Some reviewers are vexed that this book does not teach them all they need to know about the metalworking skills incident to gun building. This criticism is simply naive, because all of the sources listed in this bibliography are of little use to those who are not reasonably well versed in machine tool technology, or at least willing to put in the time to learn the basics of that subject.

In line with the foregoing objections, many readers also complain that Holmes’ methods require the craftsman to own an array of expensive tools, especially industrial machines such as mills and lathes. The lack of such machines can certainly be an obstacle to the novice gun

maker, and will be most keenly felt by those who aspire to manufacture guns in quantity. For those who wish to approach gun manufacturing as a business, this issue can be reduced to a problem of raising capital; money must be invested in machinery before the enterprise can begin to generate sufficient income to permit the purchase of manufacturing tools. Therefore, it seems that the expedient solution is to borrow money to start the business, and pay off loans with income which the borrowed money makes possible.

Permit me to suggest that this way of thinking suggests action that may be a little too precipitous. Unless you are already a well experienced machinist, and have successfully undertaken the design and production of a few guns, you should focus on studying machine tool practices, and begin your first efforts at gunmaking through the slow process of manual fabrication. For this purpose, a simple bandsaw, a free-standing drill press and a wide assortment hand tools will outfit a “deluxe” beginning workshop This experience will help you to recognize the additional tools you really need, and will permit you to cultivate a directory of customers who need simple services unrelated to firearms. With this as a base, you can continue on your gunmaking journey without financial stress.

Overall Assessment

This is a valuable book, worthy of careful study, and a proper starting point for those who wish to become gunmakers.

Title: **Manufacture Of The Model 1903 Springfield Service Rifle**
Format: **Book**
ISBN: **0935632204**
Author: **Fred H. Colvin, Ethan Viall**
Publisher: **Wolfe Publishing Co., Inc.**
Place Of Publication: **Prescott, Arizona**
Year Of Publication: **1984**
Vendor, Price: **Amazon, https://www.amazon.com, $110.00**
Material Description: **1 volume, softcover, 8.5" x 11", 332 pages, black and white drawings, charts and photos**

Subjects Covered, Key Words And Phrases

Model 1903 Springfield rifle, engineering drawings for the manufacture of
Model 1903 Springfield rifle, general specifications of the
Model 1903 Springfield rifle, jigs and fixtures for manufacture of
Model 1903 Springfield rifle, machine tools used in the manufacture of
Model 1903 Springfield rifle, narrative explanation of manufacture of

General Summary Of Work

This work was composed by authors Fred H. Colvin and Ethan Viall in 1916, at the request of the U.S. Bureau of Ordnance, when it was anticipated that the U.S. would soon be at war in Europe. It was intended to promote interest among U.S. manufacturers in the production of the basic U.S. infantry weapon. It contains the engineering drawings of all components of the 1903 rifle, illustrates the machines used in its manufacture, together with explanations of all jigs and fixtures used to produce the setups required in its fabrication.

If one wishes to learn every step involved in the manufacturing of this rifle on the eve of World War I, this is the document to study.

The version of this work as printed by Wolfe Publishing Co. contains interesting articles unrelated to the manufacturing of the 1903 Springfield, namely:

- A Description Of The Modified Enfield Rifle (model Of 1917)
- A Description Of The Lewis Machine Gun
- A Description Of The Vickers Machine Gun Model Of 1915
- Instructions To Bidders And Specifications Governing The Manufacture And Inspection Of The United States Rifle, Caliber .30, Model Of 1903
- Heat Treatment And Finish Of Small Arms At The Springfield Armory
- Overhauling The Service Rifle

Practical Skills Communicated By This Source

This work will teach the reader exactly how to build the Springfield rifle, part by part, and demonstrates an abundance of methods and machining setups which can be applied to the fabrication of other weapons.

Strong Points

This book is the only work which describes the complete manufacturing process of a modern rifle, omitting no detail of the efforts required to fabricate it. The procedures it describes are eminently “copyable” by anyone with the patience to understand them, and can certainly be applied to the production of other weapons.

Weak Points

The methods described by Colvin and Viall are definitely outdated, and many, if not most of the methods described by them, can be accomplished more quickly, and with less waste, with modern computer controlled machinery. Readers aware of modern manufacturing practice will immediately recognize that their old techniques are easily adapted to current machining technology.

Overall Assessment

This book is included because it demonstrates definite, albeit archaic, procedures for manufacturing firearms. Careful reading will force the student to consider the design considerations which must go into building any reliable gun, and to have due regard for the need to create durable fixtures for any manufacturing process. In spite of the fact that the authors based their processes on archaic machinery, anyone familiar with CNC machining will quickly see that many of the jigs and fixtures described in this book will work just as well on a Haas or Mazak vertical machining center as they did on the mills used 110 years ago.

Title: **Methods In Exterior Ballistics**
Format: **Book**
ISBN: **None Found**
Author: **Moulton, Forest Ray**
Publisher: **Dover Publications, Inc.**
Place Of Publication: **New York, New York**
Year Of Publication: **1962**
Vendor, Price: **Etsy, https://www.etsy.com, $49.00**
Material Description: **1 volume, softcover, 5.5" x 8.5", 257 pages, black and white charts and drawings.**

Subjects Covered, Key Words And Phrases

Ballistics, exterior
Ballistics, exterior, mathematical modeling as applied to
Ballistics, general tables
Projectile motion, differential equations applied to
Projectiles, motion on fixed flat earth, fixed spherical earth, and rotating earth
Rotating projectiles, motion of
Rotation and orientation of projectiles, equations describing
Trajectories, computation of
Variations affecting exterior ballistics, air density, projectile weight, speed of sound

General Summary Of Work

This is an intensely mathematical work on the subject of exterior ballistics, and treats its subject as a general branch of the exact science of physics. I think of it as "the book that treats bullets as heavenly bodies." This can probably be explained by the fact that the author was a professor of astronomy at the University of Chicago.

One reviewer, by way of an objection, called this book "*a work for mathematicians*." In response, I would say that "S*ome people are mathematicians, and some mathematicians love guns."*

This is not the latest work on exterior ballistics, and was originally published in 1926 as *New Methods In Exterior Ballistics.* The Dover edition, which I own, is the version most commonly found, and the least expensive rendition of the book. The original hard copy edition appears to have assumed the status of a collectible.

Despite its age, professional ballisticians regard this as a seminal work and still useful to experimenters and researchers.

Practical Skills Communicated By This Source

This book will teach the reader to understand the behavior of projectiles in flight, to build mathematical models of their behavior, and to predict how prototype projectiles will behave.

Strong Points

Methods In Exterior Ballistics has many strong points if the reader is sufficiently educated in mathematics. I suspect that the readers who most appreciate it are physicists and aeronautical engineers.

Weak Points

From the standpoint of one wishing to design, make and test firearms and ammunition, the weakness of this book is its great breadth and depth; it treats exterior ballistics as a general science and does not confine itself to the concerns of small arms designers, but as a general scientific work must include topics of significance for artillerists, designers of missiles and aircraft engineers. It speaks with a strong voice to the firearms innovator, but all it says is not necessary for the making of small arms.

Overall Assessment

This is an important work if one is concerned with the construction of mathematical models related to exterior ballistics. The importance of such models is immediately apparent if we consider that they form the basis of computational programs which facilitate the design of projectiles, and predict projectile behavior. It is my sincere hope that programmers capable of understanding this book can evolve that information into ever more successful computer programs, which many of us can put to immediate, practical use.

Title: **Modern Gunsmith, The**
Format: **Book**
ISBN: **051738583X**
Author: **Howe, James V.**
Publisher: **Bonanza Books**
Place Of Publication: **New York, New York**
Date Of Publication: **1982**
Vendor, Price: **Abe Books, https://www.abebooks.com, $65.77**
Material Description: **2 volumes, hardcover, 7.5" x 9.5", 907 pages, black and white drawings, charts, and photos. (2 volumes consolidated into one)**

Subjects Covered, Key Words And Phrases

Ammunition, small arms, experimentation with
Barrels, chambering
Barrels, drilling and reaming
Barrels, lapping
Barrels, relining
Barrels, rifling of
Bluing and browning
Bullets, swaging
Cases, resizing of
Chemicals, used in gun work
Craftsmanship, evaluation of
Definitions, of gunmaking terms
Drawing, mechanical
Forging and heat treatment
Gun barrels, safety analysis
Gun barrels, stresses and strains
Gun components, fitting of
Gun shop tools, specialized
Gun sights, manufacture of
Gunsmithing tools and equipment, fabrication of
Joining metals, soldering, brazing and welding
Machine tools, selection of
Materials, for gun fabrication, metals, woods, paints, varnishes, lubricants, abrasives
Metal finishing, surface
Metal, engraving of
Metallurgy, as applied to firearm manufacture
Military small arms, conversion of to sporting weapons
Military small arms, modern
Molds, bullet
Projectiles, high velocity, experimental results
Punches and dies, fabrication of
Rifles, testing, gauging wind

Shotgun, polishing bores of
Shotguns, repair and adjustment of
Special gun parts, manufacture of
Springs, making
Stocks, checkering and carving
Stocks, fabrication
Tools, selection
Tools, techniques
Workshop, planning and layout

General Summary Of Work

This is probably the widest ranging and most complete book in the English language on the subject of gunsmithing, written by a true professional who made guns his life's work. James V. Howe was also a versatile writer, with a perfect ability to communicate in clear language. This book covers more than instruction on the subject of gun repair and modification, which one might expect from a book with the word "gunsmith" in its title, but contains substantially more than ordinary gunsmithing instruction.

Practical Skills Communicated By This Source

This book is peppered with sections which communicate practical skills applicable to gun making, and goes far beyond repair and "sporterization" techniques. It teaches trade skills applicable to gun design and manufacture, and treats these skills by relating them to the fabrication of gun components. In this spirit, it covers such diverse topics as forging, heat treatment, tool and die making, spring making, the manufacture of gun sights, the selection and working of wood, the chemistry of metal bluing and browning, and engineering drawing. The careful reader will identify additional gunmaking skills contained in the pages of this valuable book.

Strong Points

The strongest aspect of this book is the clarity and directness of its instruction, combined with the wide variety of indispensable topics it covers. I deem it an advantage to possess a book which teaches us to make our own tools, and mix our own varnishes, glues, and bluing agents. One must remember that Howe wrote this book before suppliers such as Brownells, Midway, Dixie Gun Works, and McMaster Carr appeared on the scene, and craftsmen were obliged to compound their own mixtures and fabricate their own tools.

Weak Points

The same qualities which make this book uniquely useful also appear as weaknesses. For example, it would benefit from an update which covers modern methods such as the application of CNC routers to stock making, the selection of carbide tooling for machining steel, the many modern bluing formulas which have appeared on the scene during the last half century, and the plethora of other innovations which now serve the gunmaker. James V. Howe never imagined three dimensional printers, but he would have enthusiastically used them, had they been available to him.

Overall Assessment

This is a book which must be regarded as necessary to the gunmaker. It is also a book he will enjoy owning, not only for its immediate practical utility, but also for its photographs of early twentieth century armories and workshops. These images remind us of that gun making and firearms innovation are deeply embedded in our culture, and are in no small part a foundation of our military and economic success.

Title: **Modern Rifle Barrel, The**
Format: **Book**
ISBN: **None found**
Author: **Hoffman, Harold**
Publisher: **H&P Publishing**
Place Of Publication: **San Angelo, Texas**
Year Of Publication: **1988**
Vendor, Price: **Amazon, https://www.amazon.com, $99.99**
Material Description: **1 volume, softcover, 6" x 9", 158 pages, black and white photos, drawings and charts**

Subjects Covered, Key Words And Phrases

Actions, thread dimensions for
Barrels, liners for .22 rimfire, manufacturing
Barrels, chambering
Barrels, equipment and tools required to manufacture
Barrels, fitting to action
Barrels, liners for .22 rimfire, installing
Barrels, lining
Barrels, making of
Barrels, rifle
Barrels, shotguns, making of
Barrels, steels suitable for
Barrels, straightening
Buttons, rifling, fabrication of
Buttons, rifling, sizing of
Drilling, deep hole
Drilling, deep hole, converting lathe for
Drills, deep hole, construction
Furnace, heat treating, building of furnaces
Reamers, for barrels, making and using
Reaming of barrels, tools required for
Rifling, machines to produce, construction of for button rifling
Rifling, formula for twist
Rifling, instructions for button process
Rifling, machines for
Rifling, techniques
Rifling, techniques, button rifling
Tool steel, heat treating

General Summary Of Work

This book was written by Harold Hoffman, and it appears that he wrote and published it from his home in San Angelo, Texas. Exactly who he was, and what he did in the gun trade, has been the subject of some speculation. Because I want to know something of the qualifications of a writer before I repose faith in his instruction, I investigated the author to determine what experience he possessed to back up his implicit claims of expertise.

I confirmed that he worked as a successful gunsmith and barrel maker in Bucklin, Kansas, from approximately 1950 through about 1975. Bucklin is a reasonably prosperous small community located about 27 miles from Kansas City, meaning that it is located near a large market, but probably offered more affordable commercial and residential space than the big city nearby.

From time to time, guns offered at the popular online auction sites are advertised as featuring his barrels. In researching his activities, I also found that he was a contributor to the collection of shop techniques and methodologies recorded in *Gunsmith Kinks* (F. Brownell And Son, Montezuma, Iowa, 1969). I have also come across a variety of very well made folding knives made by Mr. Hoffman, and it is evident that he was a skilled metalworker.

In many ways, his career appears to have resembled that of his contemporary William Wendell ("Bill") Holmes, who wrote a variety of well known gun making books for Paladin Press. However, Hoffman did not put as much effort into making his products widely known, an aspect of business which Holmes did not neglect. It is regrettable that he did not invest more time in self-promotion, because anyone interested in his subject matter will naturally want to know what he accomplished as a craftsman.

The Modern Rifle Barrel concentrates on the process of button rifling. He states that he began experiments with button rifling in 1956, and after a year and a half of experimentation he began to enjoy success with that method. The book covers the drilling and button rifling of barrels in some depth, at least enough to enable the assiduous student to replicate his processes. He treats other topics (the making of shotgun barrels and .22 rimfire liners) in a more cursory fashion, but with enough detail to give the reader useful instruction.

Practical Skills Communicated By This Source

I recommend his book for the instruction it contains on the button rifling process. Information on this technique is rather sparse, as compared to the books and video productions covering cut rifling.

Strong Points

This book contains clear information on how to carry out barrel drilling and button rifling in your own small shop. This makes it worth buying. Button rifled barrels are probably the most

commercially viable option for the small entrepreneur who wants to enter the barrel trade, because it is a much faster operation than than cut rifling, and much less expensive than hammer forging.

Weak Points

The most disappointing part of this book is the poor writing displayed throughout the text. It does not display much elegance, and more than a little bad grammar, erroneous spelling, and in some places a lack of clarity brought on by the absence of disciplined composition. The information is clear enough that the reader can make sense of even the most ambiguous parts of the book, but one should not be put to such trouble.

It is also my modest opinion that the author did not provide sufficient information on the metallurgical problems that button rifling can induce in a barrel, because it is a forming process and not a cutting operation. It has the potential to produce changes in the material condition of the barrel due to the stresses it induces.

Overall Assessment

This book is a valuable contribution to the craft of gun making, and presents to students of the trade a rifling technique which is still insufficiently documented. I have often reflected upon how this valuable book could be greatly improved by the charitable ministrations of a good editor with a manufacturing background. Will you volunteer to undertake this project?

Title: **Paper Jacket, The**
Format: **Book**
ISBN: **1879356023**
Author: **Matthews, Paul A.**
Publisher: **Wolf Publishing Company**
Place Of Publication: **Prescott, Arizona**
Year Of Publication: **1991**
Vendor, Price: **Amazon, https://www.amazon.com, $22.50**
Material Description: **1 volume, softcover, 6" x 9", 140 pages, black and white photos and drawings**

Subjects Covered, Key Words And Phrases

Bullets, casting for paper patching
Bullets, sizing for paper patching
Bullets, types suitable for paper patching
Paper jackets, fabrication of
Paper jackets, lubricating
Paper jackets, tools and fixtures to facilitate cutting of
Paper jackets, waterproofing
Paper patched bullets, history
Paper patched bullets, loading
Paper patching, theory of

General Summary Of Work

This book contains the instruction necessary to produce functional paper patched bullets, a technology suitable for use in muzzleloading guns as well as cartridge weapons. The paper patch prevents leading of the barrel, while permitting full expansion of the bullet. The expansion of a paper patched bullet is not restricted to the extent seen in a metal jacketed projectile; the amount of expansion of a paper patched bullet is controlled by the hardness of the alloy from which it is cast, whereas a metal jacket constitutes a barrier to expansion.

In this work, detailed attention is given to the casting and swaging of bullets suitable for paper patching, the sizing, cutting and application of the patches, as well as the loading of patched bullets into cartridges. Important information is also presented on the lubrication and waterproofing of paper patched bullets.

Practical Skills Communicated By This Source

This book communicates the proper methods of paper patching lead bullets for accuracy and maintenance of a clean bore. It provides necessary information on the form of bullets suitable

for paper patching, the types of paper suitable for fabrication of bullet jackets, lubrication of jacketed bullets, and techniques used to insure the proper wrapping of paper jackets.

Strong Points

This book delivers a complete treatment of its subject, and is unequivocal in teaching the novice shooter the necessary craft techniques. It also contains interesting notes on the history of paper jackets, which preceded the use of metal in commercial and military ammunition.

Weak Points

The book successfully achieves its stated objectives, clearly communicating the fundamental skills needed to jacket bullets. If anything were to be changed about this work, I would ask that additional instruction be added concerning “post firing analysis.” That is, I would like to see more instruction on analyzing fired jackets, and reading the behavior of fired bullets, with the goal of improving patching techniques and bullet performance.

Overall Assessment

This is a valuable book, and essential reading for shooters who wish to produce ammunition yielding exceptional performance for a price well below that of commercially loaded cartridges.

Title: **Rifle Accuracy Facts**
Format: **Book**
ISBN: **None found**
Author: **Vaughn, Harold R.**
Publisher: **Precision Shooting, Inc.**
Place Of Publication: **Manchester, Connecticut**
Year Of Publication: **1998**
Vendor, Price: **Amazon, https://www.amazon.com, $145.53**
Material Description: **1 volume, hardcover, 7" x 10.5", 292 pages, black and white photos, drawings and charts**

Subjects Covered, Key Words And Phrases

Ballistics, external
Ballistics, external, influences on bullet trajectory
Ballistics, internal
Barrel to receiver joint, threaded
Barrels, vibration of
Bullet core, problems
Bullet imbalance, causes of
Bullet imbalance, effect on dispersion
Bullets, core slippage and spin up torque
Chronographs, development and use
Joint, threaded, barrel to receiver, movement upon firing
Muzzle blast, dispersion caused by
Muzzle blast, reduction of dispersion caused by
Rifle chambers and throats, design
Scopes, mount problems
Scopes, sight problems
Wind gages, use of

General Summary Of Work

The stated purpose of this work is to identify and eliminate the causes of rifle inaccuracy. It does not purport to identify all causes of inaccuracy, but might be best described as an aggressive attempt to eliminate as many as can be identified, as part of a continuing program to bring rifles ever closer to perfection. It begins by listing some of the basic requirements for an accurate rifle, those which have long been well know: a well made bore, a dimensionally correct chamber which is concentric with the bore, and good throat design.

From this starting point, the author proceeds to seek out additional causes of inaccuracy, and to identify effective methods for eliminating them. Harold R. Vaughn was a renowned expert in the science of projectile flight, and from 1959 through 1986 he was the supervisor of the Aeroballistics Division of Sandia National Laboratories in Albuquerque, New Mexico. He was

an expert in the design of experiments, and in the fabrication of test and measuring equipment for the evaluation of ballistic projectiles. His facility in the design of tests, and his ability to gather meaningful data from them, will be abundantly apparent to the readers of his book.

His research resulted in the identification of a number of factors which render a rifle inaccurate, though the book does not claim to have identified all such factors. The author regarded his work as a part of an ongoing process of improvement. I believe his labors established a foundation from which his objectives can be advanced in the future, provided serious and motivated experimenters step forward to take up the cause.

Practical Skills Communicated By This Source

The most impressive benefit of this book is the clear instruction it gives concerning fabrication of instruments capable of measuring chamber pressures, testing the stability of barrel-action joints, evaluating scope mount motion, measuring forward receiver ring moment, and otherwise harvesting reliable data related to the behavior of rifles. If you wish to know what a rifle is doing when it is fired, *Rifle Accuracy Facts* will enable you to construct the tools you need to gather an abundance of meaningful data.

It follows that the knowledge acquired through sound experimental methods should enable the builder of firearms to design and fabricate more accurate guns.

Strong Points

The most useful aspect of this book is the clear instruction it gives on the design of experiments and the fabrication of experimental devices. The mechanisms which the author teaches us to make are affordable (though not necessarily cheap), and have been used by him to acquire meaningful data. I must mention that he specifically identifies required electronic components by manufacturer and catalog number, provides schematics for assembling circuits, and specifies exactly how testing devices must be calibrated in order to harvest accurate data.

Weak Points

Without meaningful explanation, the author rejects certain suggestions concerning the causes of rifle inaccuracy. His dismissal of suggested possibilities amounts to nothing more than the statement that “I just cannot see how that is possible …” As an interested novice in the field of the experimental evaluation of rifles, I would appreciate a little more explanation, though I do not doubt the author’s expertise.

Overall Assessment

Rifle Accuracy Facts stands alone in its field as a source of instruction on the evaluation of rifle design and fabrication, and for that reason I regard it as indispensable reading for anyone who seeks to engage in the development, making and testing of guns and ammunition. I would note that this book was published in 1998, and that better and less expensive test equipment may have become available since that time. For example, the author states that he used a Tektronix 555 oscilloscope in his chamber pressure experiments. More compact and affordable oscilloscopes may now be available to take the place of the 555. I would counsel motivated experimenters to contact the manufacturers of such components to discuss their current offerings.

Title: **Rifling Machines And Methods**
Format: **Book**
ISBN: **9780615733227**
Author: **LaBounty, Clifford F.**
Publisher: **LaBounty Precision Reboring, Inc.**
Place Of Publication: **Maple Falls, Washington**
Year Of Publication: **2011**
Vendor, Price: **TZ Supplies,https://www.tzsupplies.com, $53.98**
Material Description: **1 volume, softcover, 8.5" x 11", 168 pages, black and white photos, charts and drawings**

Subjects Covered, Key Words And Phrases

Barrels, lapping
Barrels, reaming
Barrels, reboring
Gun drilling (deep hole drilling)
Rifled barrel, choking muzzle of
Rifled barrels, dimensional changes in
Rifling heads
Rifling machine, as constructed by Harry Pope, illustrated and explained
Rifling machines
Rifling machines, leader bar
Rifling machines, mechanics of
Rifling machines, sine bar
Rifling, by electrical discharge machining (EDM)
Rifling, broach
Rifling, button
Rifling, by the hammer forging process
Rifling, CNC
Rifling, progressive

General Summary Of Work

This book is a very thorough description of the machines and tooling used in the rifling of barrels, with specific and reproducible explanations of the mechanics of those devices which accomplish this function.

Practical Skills Communicated By This Source

This work provides an overview of the various types of machines used to rifle barrels, with details of the mechanical features which permit such machines to do their work.

Rifling machines may be regarded as composed of two functional elements: the mechanism which produces the helical motion which follows the form of the desired rifling, (for example, one revolution in ten inches), and the tool which cuts the groove on the path so described. LaBounty's book provides specific explanations of both features of the rifling machine.

His book merits inclusion in this bibliography because it delivers abundant specific information on how to design and fabricate various elements of these machines, with the result that the attentive reader will go away with the confidence that he knows the type of machine which will best fulfill his needs.

Strong Points

The main virtue of this work is its combination of a wide overview of rifling machines and methods, with specific descriptions of the mechanical features which make rifling machines function. The reader will also appreciate the detailed descriptions of the cutting and forming tools used in rifling machines, which makes it possible to replicate them successfully. It also contains complete descriptions of how to carry out various types of rifling operations. For example, the subject of button rifling is discussed in depth on pages 125 through 132 of the book, giving many details on how to control the buttoning process.

Weak Points

If any aspect of this book may be considered inadequate, it would have to be Chapter Seven ("Gun Drilling", pages 81 through 87)), which is interesting but does not communicate useful hands-on information. It is an interesting chapter, inasmuch as it communicates the operations which must precede the rifling process, but does not add to the chief purpose of the book. In fairness, the section on gun drilling is best regarded as an interesting aside.

I must acknowledge that this is a book on rifling, not drilling, but drilling a new hole the length of the barrel is the indispensable prerequisite to quality rifling.

Overall Assessment

This is a sound work on the craftsmanship of the rifled barrel, and fascinating reading for those dedicated to gun making. However, it really reaches its full potential if it is read as a

preparatory manual before commencing the study of Charles J. Moore's book *Steel Helix: A Gunsmith Machinist's Answer To The Question Of The Rifled Barrel,* which is also covered in this bibliography. Moore's book is a set of detailed instructions on how to build a specific type of rifling machine. LaBounty's work will make everything in *Steel Helix* clearer, and perhaps facilitate the introduction of useful modifications into the design of Moore's machine. His book merits inclusion in this bibliography because it delivers abundant specific information on how to design and fabricate the various elements of these machines.

Title: **Single Shot Actions, Their Design And Construction**
Format: **Book**
ISBN: **None found**
Author: **DeHaas, Frank**
Publisher: **Lloyd DeVore**
Place Of Publication: **Not Stated**
Year Of Publication: **1981**
Vendor, Price: **Abe Books, www.abebooks.com, $150.00**
Material Description: **1 volume, hardcover, 8" x 11", 247 pages, black and white photos, charts and drawings.**

Subjects Covered, Key Words And Phrases

Single shot rifle, systems classified by types
Single shot rifle, systems rated
Single shot rifle, history and development
Single shot rifles, a primer for designers and builders of
Single shot rifles, advice on design and fabrication
Single shot rifles, construction of
Single shot rifles, design of
Single shot rifles, ten designs explained and analyzed

General Summary Of Work

Written by the author known as "Mr. Single Shot," this book covers the design and function of the most successful single shot rifles. It has specific information on ten important rifles, namely, the Hauck action, the Clerke Hi-Wall, the Colt-Sharps, the Model 78 Browning, the Ruger single-shots, the rifles of the Falling Block Works, Inc., the Wickliffe '76 Rifle, the Cole Rifle, the DeHaas-Miller rifle, and a survey of three amateur designs. It also contains specific instructions on the fabrication of a vault-lock action, as built by the author.

Practical Skills Communicated By This Source

This book provides the attentive reader with a firm foundation in the workings of the most successful single-shot designs, and cautionary tales about some of the less esteemed single-shots. After absorbing this learning as a type of primer on single shot technology, it provides clear instructions in building a side-loading "vault lock" weapon.

Strong Points

This is one of the stars of gunmaking literature, because of its completeness and clarity. These accomplishments are probably facilitated by the fact that it is so specific, treating only of single shot weapons. The instruction it provides in building a vault lock action rifle leaves nothing to the imagination, and covers all of the design concerns related to that specific type of rifle. The author's presentation is enhanced with excellent drawings created by his son, professional engineer Mark DeHaas.

Weak Points

I do not think it would be fair to claim that this book suffers from any weak points. It was written by a man who must be regarded as the world's foremost authority on single shot designs, and who owned them, repaired them, and built them during the entirety of his long life. In order to make the construction of his vault lock rifle easier for the beginner, I can suggest that the novice gun maker would benefit by reading Bill Holmes' book, *Home Workshop Prototype Firearms*, before starting his build. A review of Holmes' book is included in this bibliography.

Overall Assessment

This is a necessary book for anyone who aspires to become a gun maker. It is one of the best works ever produced on the design and fabrication of single-shot rifles.

Title: **Small Arms Design And Ballistics**
Format: **Book**
ISBN: **None Found**
Author: **Whelen, Townsend**
Publisher: **Palladium Press**
Place Of Publication: **Birmingham, Alabama**
Year Of Publication: **2000 (Reprint)**
Vendor, Price: **Amazon, https://www.amazon.com, $97.95**
Material Description: **2 volumes, hardcover, 6" x 9", 666 pages (total both volumes), black and white photographs, drawings and charts.**

Subjects Covered, Key Words And Phrases

Actions, manually operated
Actions, semi-automatic
Ammunition, bullets
Ammunition, cases and shells
Ammunition, general considerations
Ammunition, hand loading of
Ammunition, primers
Ammunition, propellant powders
Ammunition, the loaded cartridge
Arms and ammunition, care and storage
Ballistics, exterior
Ballistics, interior
Ballistics, shotguns
Barrels, general considerations
Power, wounding and killing
Pressure, determination of
Ranges, testing
Recoil
Rifling, general information on the rifled bore
Sights
Small arms, general considerations
Stocks
Trajectory, determination of
Trajectory, general study of
Velocity, determination of
Wind, effects of

General Summary Of Work

This work was published in 1945/1946 in two volumes, the first dedicated to small arms design, the second to ballistics. It was originally published by Samworth's Small Arms Technical Publishing Company, but was republished by the NRA in 2000, as part of its Firearms Classics Library. I own the NRA edition, published by Palladium Press.

This two-volume set is multifaceted. It is a sound and well-written summary of small arms technology as it existed in 1945, and the author states that his purpose in writing is to create an exposition for the education of shooters, teaching them why small arms do what they do. He also makes it clear that he tries to do this without resorting to the intensely mathematical treatment found in *The British Text book Of Small Arms, 1929,* which he found to be worthwhile but above the head of the average sportsman. (*The British Textbook Of Small Arms 1929* is also reviewed in this bibliography.)

Much has changed in the world of small arms since 1945, but the changes have not varied the core principles of arms design and ballistics. The most notable changes have been the methods of fabrication (CNC technology, hammer forging of barrels, etc.), various new types of actions (e.g., the mechanism of the Kalashnikov), and less expensive and more accurate instrumentation for testing such things as velocity and pressure. However, the statements made by Whelen in this work have not been refuted, and one may accurately say that the technology he elaborates has only been refined.

Practical Skills Communicated By This Source

These books are the vessel Whelen intended them to be, an exposition for the education of shooters, teaching them why small arms do what they do. However, the designer and fabricator of small arms and ammunition can use these books for purposes that go beyond Whelen's stated goal, because they also serve as a foundation for planning and innovation.

If we determine that we require a weapon that will meet certain criteria, and be suitable for a particular purpose, an attentive reading of *Small Arms Design And Ballistics* will help us to choose (or design) an appropriate cartridge, a correspondingly reliable action, sights appropriate to the cartridge chosen, and generally plan all the other the other features that will permit us to realize our purpose.

Strong Points

Small Arms Design And Ballistics teaches us how all the elements in a weapon work together to create a system that achieves a certain purpose, and this work describes those elements in a way that permits us to know what the features of our desired arm must be.

Weak Points

As with many other sources reviewed in this *Bibliography For Makers Of Small Arms*, the most conspicuous weakness of Whelen's books is that they do not teach everything one needs to know to design, fabricate and test small arms and ammunition. This will teach you what to design, but contains little to advance the fabrication of the parts you must make to create your weapon.

Overall Assessment

I have a strong prejudice in favor of books which teach us how to fabricate small arms, and more particularly how to create the shapes, parts and features we find in existing firearms. To be plain, many of the works reviewed in this bibliography really teach us how to copy what we see. I favor such information because it is so hard to come by, and because it serves as a correction for the many who think that "Guns can only be made in factories …"

A careful reading of Townsend Whelen's books will compel one to acknowledge that guns are tools, tools are made to fulfill particular purposes, and that to fulfill a particular purpose a gun must integrate components which work together to optimize its suitability for that purpose. Whelen helps us to determine which features and components must be chosen to make the guns we want.

The disaffected gun buyer is frequently unhappy because he discovers, after the fact, that the weapon he purchased cannot perform tasks that he never took into account when he made his purchase. As designers, we should define the tasks we wish our designs to perform. If we hope to fabricate a weapon with new capabilities, we can sometimes succeed by combining the elements of existing designs in novel ways. This work is a robust starting point for those adopting this approach.

Title: **Steel Helix: A Gunsmith Machinist's Answer To The Question Of The Rifled Barrel**
Format: **Book**
ISBN: **9780615862828**
Author: **Moore, Charles J.**
Publisher: **The Appalachian Rifle Shop**
Place Of Publication: **Mt. Lake Park, Maryland**
Date Of Publication: **2012**
Vendor, Price: **Steel Helix, https://www.steelhelixrifle.com, $49.95**
Material Description: **1 volume, softcover, 190 pages, black and white photos, drawings and charts**

Subjects Covered, Key Words And Phrases

Barrel drilling and rifling machine, tools required to fabricate
Barrel machine, design of a three-in-one (drilling, reaming and rifling)
Barrel tooling, fabrication of
Barrel, rifled, machining operations to produce a
Barrels, drilling
Barrels, proofing of
Barrels, reaming
Barrels, rifling
Barrels, various methods for rifling
Oil system, construction of a high pressure
Rifling guide bars, fabrication of
Steels, properties required for rifle barrel
Steels, selection of for barrel

General Summary Of Work

This book provides exact instructions on the building of a machine which can drill, ream and rifle a barrel. It describes the specific processes for making barrels, including preparation of the cutting tools used in the machine, lubrication during the drilling and rifling process, and selection of appropriate barrel steels. The vendor's web site accurately describes this book as a complete manual for converting a steel bar into a rifled barrel.

Practical Skills Communicated By This Source

This book is utterly pragmatic in all respects. It provides unequivocal instruction on how to fabricate a leader bar rifling machine, e.g., a machine that uses a helical cylinder to guide a rifling cutter through a barrel that has already been drilled and reamed on that same machine.

Strong Points

This book contains everything a machinist must know to build a machine for the drilling and rifling of gun barrels, and teaches the student how to efficiently use the machine to manufacture barrels. It is as unequivocal in its instruction as one could wish it to be.

Weak Points

I am hesitant to say that this book has any weak points, because it does what it claims to do. It covers one single type of machine, and does so in a thorough and accurate fashion. The fact that it rather ignores other types of machines is not a valid objection, since there is no reason for the author to cover machines of which he has no experience.

All of this being said, the reader must be cautioned that no book can make up for a lack of machining skill on the part of the user. All of the materials included in this bibliography presuppose that the user is capable of carrying out certain metalworking operations, some of them relatively complex.

Overall Assessment

If there is a set of “best books” on the design, making and testing of guns, this book is assuredly included in that set. As stated elsewhere in this bibliography, the value of this work will be substantially enhanced if one first reads Clifford F. LaBounty’s book *Rifling Machines And Methods.* LaBounty’s work will provide a meaningful introduction to the technology elaborated in *Steel Helix*. In turn, it must be said that a careful reading of *Steel Helix* will enhance the learning to be extracted from LaBounty’s book. If the reader chooses to read one, it is suggested that he resolve to read both, to maximize his knowledge.

Title: **Textbook Of Small Arms 1929, The**
Format: **Book**
ISBN: **None found in original edition. (Recent reprints may bear ISBNs)**
Author: **Multiple contributors**
Publisher: **His Majesty's Stationary Office**
Place Of Publication: **London**
Date Of Publication: **1929**
Vendor, Price: **H.M. Stationary Office, London, 5s (original printing)**
A quality scan may be viewed and downloaded at
https://archive.org/details/textbooksmallarms1929/mode/2up
Material Description: **1 volume, hardcover, 8.5" x 11", 427 pages, black and white photographs, black and white drawings and charts, oversized pullouts.**

Subjects Covered, Key Words And Phrases

Ammunition, manufacture of
Ballistic pendulum
Ballistics, exterior
Ballistics, interior
British firearms, through 1929
Chronograph, Le Boulenge
Chronographs
Evolution, firearms
Evolution, small arms
Greenhill's formula, explained
Greenhill's formula, reduced to pragmatic rule of thumb
Machine guns, review of those in use as of 1929
Methods in ballistics, descriptive and numerical
Military small arms ammunition, review of those in use as of 1929
Projectiles, rate of twist required for stability of
Propellants
Rifling, calculating rate of twist
Testing of small arms, instrumentation for

General Summary Of Work

This is the venerable and highly prized version of the Textbook Of Small Arms, as published in its final form in 1929. It is frequently referred to by American authors as *"The British Textbook Of Small Arms 1929,"* and was a favorite of no less an authority than Maj. General Julian S. Hatcher. It is the last of a series of books published by the War Office of Great Britain in 1868, 1877, 1880, 1888, 1894, 1904, 1909 and 1929.

If I were obliged to summarize what this book is about, and why it was published, I would state as follows: It was written and distributed to educate British officers in the essential knowledge of their country's infantry weapons, and in particular to show them why the small arms in use by the army of Great Britain are designed and constructed as they are.

Of course, there is much more to this work than this sentence captures, but I think it is a good synopsis of its main purpose. The *Textbook* is abundantly mathematical, but it reduces much mathematical calculation to formulae which might best be described as *severely practical*. If one proposes to design a new rifle, this book will raise the designer's awareness that rifles are designed to fulfill specific tasks, i.e., to deliver a projectile with a specified striking energy at a specified range, following a prescribed trajectory while yielding a certain level of recoil, and maintaining a certain minimal rate of fire.

Practical Skills Communicated By This Source

Within the pages of this work, a ballistician developing a new cartridge, or a designer planning a new rifle, can locate equations useful in modeling the behavior of the proposed cartridge or rifle. This information can be used in conjunction with modern computerized spread sheets to answer many "what if" questions.

For our purposes, it is also a rich source of basic knowledge of instrumentation, and effectively communicates various technologies which allow us to gather useful data from which we may compute the velocity of a projectile at a given distance from the muzzle, the pressure generated within the barrel of a rifle, and predict the ability of a bullet of a given configuration to overcome the resistance of the air.

This is but a small sampling of the practical knowledge contained in the *Textbook*.

Strong Points

This work pulls together, in one volume, all that the practical student needs to know concerning the behavior of small arms projectiles within the bore of the weapon (interior ballistics) and in flight (exterior ballistics). Taken as a whole, it will give the serious reader a fairly complete idea of the instrumentation needed to outfit a small arms design laboratory, even if the particular instruments it presents have been superseded by more convenient designs.

Weak Points

A book will strike us as strong or weak according to how well it delivers the specific information we want. The *Textbook* provides the essential information needed by small arms designers and gunmakers when planning a weapon based upon performance requirements.

The down side of the *Textbook* lies in the fact that it represents an attempt to cover all small arms, and not just infantry firearms. Therefore, it includes chapters on swords, grenades, and other items of militaria you may not desire to study.

Of course, it must be remembered that the *Textbook* was clearly designed to support a class, or a series of academic classes, on multiple subjects. The fact that it does not confine itself to our favorite topics cannot detract from the value of the information we garner from it.

Overall Assessment

For purposes of designing, making and testing small arms and ammunition, the *Textbook Of Small Arms 1929* is a truly seminal work, and should be considered indispensable for anyone with an interest in this topic.

This work was out of print and virtually unobtainable in the United States for many years, a circumstance lamented by General Julian Hatcher. It was finally republished by several private print houses in the early 2000s. Those who want a crisp hard copy will have little trouble in finding one at a reasonable price. An original edition from the War Office of Great Britain can also be found, but be forewarned that it will carry a price tag reflecting its status as a highly desired antique.